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(54) **Paper tissue roll**

(57) The invention relates to a roll of paper tissue separated into a plurality of tissue segments by means of lines of weakness, each tissue segment having a width between opposite side edges, and a length between lines of weakness, each line of weakness being essentially straight, and extending orthogonally relative to the side edges of the paper tissue wherein the basis weight of the paper tissue is at least 40 g/m<sup>2</sup> and wherein the ratio of the length of a tissue segment to the width of the tissue segment is at least 1.7:1.

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## Description

[0001] The present invention relates to a roll of paper tissue separated into a plurality of tissue segments by means of lines of weakness, and to the use of such a roll, particularly for toilet tissue.

[0002] Paper tissues or sheets, such as paper towels, facial tissues, and toilet tissues, are a staple of everyday life. The large demand and constant usage for such consumer products has created a demand for improved versions of these products.

[0003] It has long been recognised that three important physical attributes of these products are their softness; their absorbency; and their strength. Research and development efforts have been directed to the improvement of each of these attributes without deleteriously affecting the others as well as to the improvement of two or three attributes simultaneously.

[0004] Softness is the tactile sensation perceived by the consumer as he/she holds a particular product, rubs it across his/her skin, or crumples it within his/her hand. This tactile sensation is a combination of several physical properties. One of the more important physical properties related to the softness is generally considered by those skilled in the art to be the stiffness of the paper tissue from which the product is made. Stiffness, in turn, is usually considered to be directly dependent on the dry tensile strength of the web.

[0005] Strength is the ability of the product to maintain physical integrity and to resist tearing, bursting, and shredding under use conditions. Absorbency is the measure of the ability of a product to absorb quantities of liquid,

[0006] particularly aqueous solutions or dispersions. Overall absorbency as perceived by the human consumer is generally considered to be a combination of the total quantity of a liquid a given mass of tissue paper will absorb at saturation as well as the rate at which the mass absorbs the liquid.

[0007] Of these three attributes, softness and strength are the two most important attributes for toilet tissue. Toilet tissue is most commonly supplied to the consumer in the form of a roll. Usually the roll is separated into a plurality of tissue segments by means of lines of weakness in order to facilitate the tearing off of a length of paper tissue for use. Each tissue segment has a width between opposite side edges, and a length between lines of weakness, each line of weakness being essentially straight, and extending orthogonally relative to the side edges of the paper tissue.

[0008] US-A-4 687 153, issued on August 18<sup>th</sup>, 1987, discloses an apparatus suitable for making tear-separable multi-sheet rolls of toilet tissue, in particular by perforating the paper tissue. The possibility to change sheet length (i.e. length between the perforations) and sheet count (i.e. the number of sheets in a roll) is also suggested. The patent does not suggest however how sheet lengths might be optimised.

[0009] By their very nature, the lines of weakness impair the overall strength of the paper tissue when two or more tissue segments are used.

[0010] The object of the present invention is to maintain the utility of lines of weakness in order to tear off a given length of paper tissue, whilst at the same time to improve the overall strength of the given length of paper tissue.

[0011] It is a further object of the invention to provide a tissue product that consumers can fold in an instinctive or habitual way, which is less likely to fail in use because it provides a cleaning zone which contains no lines of weakness.

## Summary of the Invention

[0012] This object is achieved by providing tissue segments having a basis weight of at least 40 g/m<sup>2</sup>, and wherein the ratio of the length of a tissue segment to the width of the tissue segment is at least 1.7:1, preferably at least 1.9:1, and more preferably at least 2.5:1. The roll of paper tissue according to the present invention may be used for dispensing tissue segments, in particular for dispensing toilet tissue.

## Detailed Description of the Invention

[0013] A very high proportion of consumers fold paper tissue, especially toilet tissue, prior to use. The habit of most of these consumers is to fold the tissue once, giving a double thickness of tissue, although some consumers fold more than once. The result is a piece of tissue two or more sheets thick, having an essentially planar cleaning zone. A perforation in any part of the cleaning zone represents a weakness, and increases the likelihood of failure during use. By failure it is meant that the tissue tears, breaks or bursts resulting in impaired cleaning performance, and, in the case of toilet tissue, in unpleasant messiness for the consumer.

[0014] It has now been found that many consumers fold toilet tissue so that it has a length roughly equivalent to the distance from the tip of the middle finger to the base of the thumb (i.e. just above the wrist), or slightly greater than this length. Commonly, for adults, this length is from 160 to 200 mm. Furthermore the standard width of toilet tissue is about 100mm to 120mm (which corresponds roughly to the width of the hand from thumb to smallest finger when the fingers are held together, side by side).

[0015] Another common habit amongst consumers is to use the cleaning zone of the tissue paper for a first cleaning operation, then subsequently to fold the tissue paper again, with the soiled first cleaning zone to the inside, and reuse the tissue paper for a second cleaning operation. This may even be repeated by folding the soiled second cleaning zone to the inside, and reusing the tissue paper for a third cleaning operation.

[0016] The present invention enables the high propor-

tion of consumers who have either or both of these habits to tear off multiple segments of tissue from a roll, and fold them in such a way that presents a cleaning zone which is completely free of perforations. This means that the risk of product failure during use is significantly reduced. Furthermore, for the consumers who use the first cleaning zone, and then refold and reuse the tissue paper at least one more time, the benefit of always having a cleaning zone which is free of perforations is even more important. These consumers are less likely to experience leakage of soil through the tissue paper during the second and subsequent cleaning operations.

[0017] In a particularly preferred embodiment of the invention each tissue segment is long enough for the consumer to tear of one segment, and only one segment, at a time. These consumers will benefit from economies by using, for example a single segment of 190mm length per cleaning operation, compared to standard tissue where the same consumer would habitually have required two sheets of, for example, 140mm length, i.e. 280mm length of tissue in total.

[0018] In another, alternative, but particularly preferred embodiment of the invention the consumer can tear off two tissue segments from the roll, and can use the perforation which is at the junction of these two segments as an assistance to folding the segments.

[0019] According to these particularly preferred embodiments of the invention, the tissue paper should have a basis weight of at least 40 g/m<sup>2</sup>, and even more preferably at least 50 g/m<sup>2</sup>, in order to provide sufficient tissue paper material when cleaning with only one or two tissue segments.

[0020] By length, it is meant herein the length of paper tissue measured in the direction which corresponds to the direction around the circumference of the paper tissue roll; and by width it is meant herein the width of paper tissue measured across the roll, from side to side, parallel to the axis of the roll. It is highly preferred that the direction around the paper tissue roll, i.e. the length, is the machine direction of the paper tissue, and that the direction across the roll, i.e. the width, is the cross-machine direction of the paper tissue.

[0021] By line of weakness, it is meant herein that the tissue paper has a means of tearing, wherein the means of tearing makes it easier for the consumer to tear along the line of weakness than to tear along some other line. A highly preferred line of weakness is a perforated line. A perforated line is a plurality of spaced, elongated slits, each axially aligned to one another, and each one being separated from the next by a piece of the tissue extending between adjacent slits.

[0022] By dispensing, it is meant herein that the product of the invention can be removed from a roll of paper tissue, and the required length can be torn off by tearing along a preformed line of weakness in the paper tissue. The product of the present invention can be used for various cleaning tissues and wipes including facial tissues, and absorbent tissues and wipes for cleaning

hard surfaces. The preferred use of the present invention is the use of a roll of tissue for dispensing toilet tissue.

[0023] Tissue paper useful in the present invention may be made by common methods well-known to the person skilled in the art, such as by dewatering suitable pulp using, for example, papermakers felt. This process may be carried out in batch, but commercially it is usually carried out on continuous papermaking machines. Highly preferred tissue paper may be made by the processes described in US-A-3 301 746, published on January 31<sup>st</sup> 1967, or EP-A-0 140 404, published on May 8<sup>th</sup> 1985. Paper made according to EP-0 140 404 is composed of first and second regions, the first region having a macroscopically monoplanar, patterned, continuous network having a high density and a low basis weight relative to the second region, and the second region being composed of a high basis weight and plurality of discrete domes having low densities relative to the first region. The preferred average density of the first, network, region is from 0.4 to 0.8 gram per cubic meter and the average density of the domes of the second region is from 0.04 to 0.15 gram per cubic centimeter. Optional steps for the process of making the web, or for subsequent processing, include foreshortening, or creping; embossing and printing.

#### Example

[0024] A roll of tissue was manufactured using the apparatus and method disclose in US-A-4 687 153. The apparatus was set up in order to provide a roll of single-ply tissue paper, the roll being divided into segments by perforated lines, each segment being 194 mm long and 100 mm wide.

#### Claims

1. A roll of paper tissue separated into a plurality of tissue segments by means of lines of weakness, each tissue segment having a width between opposite side edges, and a length between lines of weakness, each line of weakness being essentially straight, and extending orthogonally relative to the side edges of the paper tissue, wherein the basis weight of the paper tissue is at least 40 g/m<sup>2</sup>, and characterised in that the ratio of the length of a tissue segment to the width of the tissue segment is at least 1.7:1.
2. A roll of tissue paper according to claim 1 wherein the ratio of the length of a tissue segment to the width of the tissue segment is at least 1.9:1, and more preferably at least 2.5:1.
3. A roll of paper tissue according to either of claims 1 or 2 wherein the length of a tissue segment is at least 160 mm, and the width of a tissue segment is

less than 120 mm.

4. A roll of tissue paper according to any of the previous claims wherein the line of weakness is a perforated line. 5
5. Use of a roll of paper tissue for dispensing tissue segments, the roll of paper tissue separated into a plurality of tissue segments by means of lines of weakness, each tissue segment having a width 10 between opposite side edges, and a length between lines of weakness, each line of weakness being essentially straight, and extending orthogonally relative to the side edges of the paper tissue, wherein the basis weight of the paper tissue is at 15 least 40 g/m<sup>2</sup>, and characterised in that the ratio of the length of a tissue segment to the width of the tissue segment is at least 1.7:1.
6. Use of a roll of paper tissue according to claim 5 20 wherein the ratio of the length of a tissue segment to the width of the tissue segment is at least 1.9:1, more preferably at least 2.5:1.
7. Use of a roll of paper tissue according to either of 25 claims 5 or 6 for dispensing toilet tissue.

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Application Number  
EP 98 10 8674

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cls)
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			TECHNICAL FIELDS SEARCHED (Int.Cls)
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 1 October 1998	Examiner Delzor, F
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons A : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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The members are as contained in the European Patent Office EDP file on  
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01-10-1998

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